

Evaluation & Development of Pipeline Inspection Technologies and Direct Assessment Practices

Description: A validation of the external corrosion direct assessment process as described in the NACE standards.

Status: Initial tests of a variety of pipeline inspection technologies were conducted and Direct Assessment (DA) protocols were standardized. DA data was collected on 20 miles of transmission pipe in NYS and statistical validation was confirmed. Data was collected on an additional 50+ miles of pipe by NYSEARCH/NGA participants from around the country.

BENEFITS

Assessing Pipeline Integrity by smart pigs or hydrostatic testing can be physically and/or economically impractical, and in some cases it is impossible. In addition, hydrostatic testing (and sometimes smart pigging) requires service interruption resulting in dissatisfied consumers.

Thus, until advanced technologies for “unpiggable” pipelines become available, DA practices may be the best alternative to comply with new U.S. DOT rules.

DA practices do not require taking pipelines out of service at

any one time and allow operators to focus resources on problem areas.

Accurate pipeline integrity assessment can improve safety and aid in prioritization of repair/replacement decisions.

BACKGROUND

In 2003, the U.S. DOT issued a rulemaking that contains requirements for assessing the integrity of gas transmission pipelines in high consequence areas (HCAs). Three specific approaches to assess the integrity of transmission pipelines are permitted: hydrostatic pressure testing, in line inspection (ILI), and direct assessment (DA). In addition, provisions are allowed for an operator to use other technologies that are demonstrated to be equivalent.

Hydrostatic pressure testing and ILI are widely accepted by both regulators and industry. The DA process (both for external corrosion and internal corrosion)

is relatively new. In order for the DA process to gain acceptance by the regulatory community, evidence is needed to show that this technique and the tools that are used with this technique can provide an effective integrity management tool.

TECHNICAL APPROACH

NYSEARCH, the research, development, and demonstration organization within the Northeast Gas Association (NGA) and the NGA Direct Assessment Working Group embarked on a program first to investigate technologies that could be used to assess transmission pipes for coating damage. This task was followed by a highly rigorous validation of the DA process. Besides identifying various tools that could be used to inspect pipeline coating condition, the first two tasks of the program determined the state-of-the-art and identified the need for further R & D for some of the tools. Also, interaction among



Close Interval Survey Measurements being taken as part of DA Process

the participants within the operations groups of Northeast Gas Association previously NYGAS identified the need for the LDCs to standardize DA practices. After careful discussion among themselves and with the Gas Safety staff of the NY Department of Public Service (PSC), it was decided that the companies should work to achieve a standardized approach by following a new NACE protocol and investigate its statistical accuracy with extensive field testing.

In the first task that focused on DA practices, each LDC participant surveyed one to two miles of its system. Indications that represented potential external corrosion via the DA process (ECDA) were selected for excavation, and the results of direct examinations were compared with the results of excavations at locations other than the indications (i.e., control sites). The control sites were locations expected to have pipe in good condition. All work was done in cooperation with the NY PSC.

In the subsequent work approved for focus on DA, additional data is being collected on up to (60)



miles of pipe by (10) companies. In addition, participants are

formalizing consistent protocols for special areas (eg, cased pipe, stray current areas, etc). Internal Mechanical Damage detected by ECDA Corrosion Direct Assessment (ICDA) and process are also being addressed.

PROJECT STATUS

The first DA validation effort demonstrated with statistically supported confidence, that the DA process when applied in accordance with the NACE ECDA Standard (RP0502), is an effective pipeline integrity verification technique that is capable of finding areas of coating flaws and corrosion.

The results of this project were presented in various regulatory and industry forums at the state and national levels. These results support DA as an alternative to ILI and hydrostatic testing.

Subsequent DA validation efforts and data collection were conducted for over (50) miles of pipe. Also protocols were discussed for cased pipe, pipe in inaccessible areas, bare pipe, and pipe in stray current areas.

Today, many of the funding members are using these results of this ECDA validation in their ECDA Operating plan.

Major findings from the 2002/03 effort to Validate Direct Assessment include:

- Protocol validated on over (20) miles of pipe where (66) excavations were performed
- For the pipelines in the sample, the probability of finding a coating flaw or corrosion damage at an ECDA indication was 98%
- For the pipelines in the sample, the odds of finding a coating flaw or corrosion damage at an indication compared to a control was approximately 300 to 1.

FOR ADDITIONAL INFORMATION

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